Part I

A Changing Food System

Food connects us all. Yet the oft-repeated pledges to create a well-fed world in which hunger is abolished are still words, not reality. What has changed since the 1990s is the creation of new global rules made in different negotiating fora by groups and ministries dealing with different interests. These are reshaping the framework in which people working in the food system operate. It is a system in which different actors vie for power and control over the area that they work in, seeking to minimize or offload the risks they face and maximize or optimize the benefits they get.

Part I of this book provides a brief guide to the contemporary food system, the range of actors and interests in it, the tools they seek to use for control, and the increasingly important role of laws, rules and regulations, not just nationally but globally. Next, it outlines the basics of 'intellectual property' and then briefly examines the growing importance of rules on patents and other forms of intellectual property in shaping future food systems and certain issues surrounding these.

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Farming, Food and Global Rules

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This chapter first gives a brief overview of today's dominant food system in which four key words – power, control, risks and benefits – are seen as vital for the major actors in the system. It discusses the dynamics of the system and then provides a brief background to the legal fiction that is intellectual property – patents, copyright, plant variety protection, trademarks, and so forth – and associated concerns as global rules on it continue to grow. Finally, the chapter looks at the growing role of intellectual property in food and farming and the concerns surrounding this.

Introduction

Serious doubts have been raised about the long-term viability of the industrial farming model that is spreading from the industrialized world to other countries. Yet the long-term viability of farming is central to ensuring food security for everyone on this planet (Box 1.1). Many now call for more ecologically sustainable approaches to farming built around biodiversity and ecology. Yet others, sure of humankind's inventive capacity or responding to their industry's interests, promote further intensification and industrial approaches to farming as the way forward. Thus the future direction of farming is highly contested (Lang and Heasman, 2004).

What is clear is that there are serious flaws in a food system that globally leaves more than 850 million people undernourished and over 1 billion overweight (300 million of them obese). Some 2 billion people also suffer from vitamin and micronutrient shortages. Undernutrition in pregnant women and young babies can have irreversible effects for life, while obese people's lives are threatened by diet-related non-communicable diseases such as diabetes and heart attacks.

For decades, governments have made fine commitments to end hunger and deal with malnutrition, notably at the World Food Summit held at the UN Food and Agriculture Organization's Headquarters in Rome in 1996 (Box 1.2). They have also recognized, at least since the first global conference on the environment in Stockholm in 1972, that the environmental impact and consequences of human activity on the planet are fundamental to our survival. Yet it took almost 20 years before the central role of biodiversity as the basis for healthy ecosystems was addressed internationally (see Chapter 5).

Agricultural biodiversity, which has been developed through the creative activity of farmers over thousands of years (Chapter 6),

Box 1.1 Levels and elements of food security

Globally, food security depends on a range of things, including:

- our ability to minimize/manage/react to climatic change and disruptions to food production by holding suitable stock levels and having emergency distribution arrangements in place; and
- ensuring new technologies enhance this capacity and do not increase the risk of major disruptions in food supply through unforeseen consequences on ecological viability.

Regionally and nationally it includes:

- maintaining the capacity to produce and/or import the food requirements of a population and ensuring a distribution system or entitlements that enable all people within the borders to produce or acquire the food they need (by production, purchase or special schemes);
- maintaining an R&D (research and development) system that includes farmers and is able to deliver continued improvements to all aspects of production systems used by the full range of farmers in the country and cope with variability (agro-ecological and economic) and climatic changes; and
- ensuring both rural and urban dwellers are able to secure their livelihoods and so have access to the food they need, either from direct production, purchase or barter.

At the community and household levels it requires:

- continued ability to maintain livelihoods that allow production/procurement of food needs in an appropriate manner;
- use of risk management strategies suitable to local needs and customs to prevent impoverishment;
- prevention of conflicts and of the use of food as a weapon;
- support for those in marginal areas/environments to increase productivity, or if they are forced out for there to be alternative livelihood possibilities available; and
- equitable gender and inter- and intra-household distribution.

Source: Adapted from Tansey (2002)

and is a necessity for food security, was discussed in the 1980s and 1990s. Concerns over genetic erosion and the continuing loss of the many varieties of plants important for human survival led to a major conference of the UN Food and Agriculture Organization (FAO) in 1996 and a Global Plan of Action to combat the loss of plant genetic diversity. Unfortunately, similar losses of animal genetic diversity are only now beginning to be addressed (Box 6.6) and action on both is far from adequate.

Another recent change has been the rapid extension of a legal system (patents) developed to encourage innovation in inanimate objects into the area of living organisms. This was led by the US in the 1980s. It is linked to the commercial application of insights from a major revolution in our understanding of biology that allows new techniques such as genetic engineering and its application in medicine and agriculture in particular. For some, the whole idea of extending patents into the living world is intrinsically wrong. For others, problems only arise should there be adverse consequences. The push to extend patents has not only come from commercial interests in biology but also from developments in information science and the ability to digitally encode and manipulate all kinds of information.

Box 1.2 Fine words, poor implementation

Everyone has a right to a standard of living adequate for the health and wellbeing of himself and his family, including food. (Universal Declaration of Human Rights, 1948)

States Parties … recognize the fundamental right of everyone to be free from hunger. (International Covenant on Economic, Social and Cultural Rights, 1966)

Every man, woman and child has the inalienable right to be free from hunger and malnutrition in order to develop fully and maintain their physical and mental faculties. Society today already possesses sufficient resources, organizational ability and technology and hence the competence to achieve this objective. Accordingly, the eradication of hunger is a common objective of all the countries of the international community, especially of the developed countries and others in a position to help. (World Food Conference, 1974)

We pledge to act in solidarity to ensure that freedom from hunger becomes a reality. (International Conference on Nutrition, 1992)

We, the Heads of State and Government, or our representatives, gathered at the World Food Summit at the invitation of the Food and Agriculture Organization of the United Nations, reaffirm the right of everyone to have access to safe and nutritious food, consistent with the right to adequate food and the fundamental right of everyone to be free from hunger.

We pledge our political will and our common and national commitment to achieving food security for all and to an ongoing effort to eradicate hunger in all countries, with an immediate view to reducing the number of undernourished people to half their present level no later than 2015.

Food should not be used as an instrument for political and economic pressure. We reaffirm the importance of international cooperation and solidarity as well as the necessity of refraining from unilateral measures not in accordance with the international law and the Charter of the United Nations and that endanger food security. (World Food Summit, 1996)

In 1970, there were about 960 million hungry people. Today there are just over 100 million less*. There are, of course, many more people in the world today than at the time of the first World Food Summit in 1974 – called after a major famine in Ethiopia in the early 1970s, indicating that there has been progress in feeding people since then. However, this progress has not gone far enough. Food production in general – although not in sub-Saharan Africa – has kept pace with or exceeded population growth. Moreover, obesity was not a major global concern then, although it worried some, especially in the US.

The world is in danger of failing to meet the relatively modest aim agreed in the 1996 World Food Summit of halving the *number* of hungry people by 2015. Even this aim was watered down further in the Millennium Development Goals, where it became the more modest goal of halving the *proportion* of hungry people, which may also be missed.

Note: * In 1969–1971 there were just over 960 million people undernourished in developing countries. This had fallen to 820 million in 2001–2003, with a further 24.7 million in countries in transition and 9.3 million in industrialized countries making a total of 854 million.
Source: FAO, see www.fao.org/faostat/foodsecurity/index_en.htm for details

In a world with global markets, enterprises and problems, national responses and rules are no longer sufficient to tackle sensitive food, environmental and economic issues. New global negotiating processes have led to a range of new treaties on trade, biodiversity, and plant genetic resources for food and agriculture which were influenced by the concerns of some countries about patents and other forms of intellectual property (IP).

New institutions, new challenges

In the 21st century, new institutions producing global rules are reshaping the framework in which people concerned with food operate – from smallholders and farm families to global corporations. However, because of the political weight which they command in developed countries, the latter have a disproportionate impact in shaping the increasingly changing global rules within which different actors in the food system have to operate.

Some key questions arise from these changes: What will the long-term impact of these global rules be? Whose interests will they serve? Will they help make the food system more functional, in reducing all forms of malnutrition, from under- to over-nutrition, in an ecologically sustainable manner? But to address these we need an understanding of just what the rules are, how they arose and what may be done with them in the future. This book provides a guide to some of the global rules that:

- govern trade, in particular those that link trade rules to those on patents, copyright, trademarks and other forms of IP. These privilege some to the detriment or exclusion of others, in theory for the social and economic benefit of all (Chapters 2, 3 and 4);
- aim to conserve and promote the use of the enormous biodiversity on the planet and ensure the sharing of the benefits from using this (Chapter 5); and
- make special provision for agricultural biodiversity in the field of plants (but not yet that of animals), dealing with its unique characteristics as a way of safeguarding future food security globally (Chapter 6).

Different interests have been driving the various negotiations on these rules, which have also led to the creation of new global institutions. Perhaps the most important of these is the creation, in 1995, of the World Trade Organization (WTO), which came out of the Uruguay Round of trade talks begun in 1986 under the General Agreement on Tariffs and Trade (GATT). The key difference between the WTO and existing UN organizations – specialized agencies like the World Health Organization (WHO) and the FAO or that dealing with the Convention on Biological Diversity (CBD), which administratively is part of the UN Environment Programme (UNEP) – is that the WTO has a binding dispute settlement mechanism backed by sanctions. This means that countries that fail to follow its rules face real consequences, which is not the case for most other international bodies, except the UN Security Council.

When the WTO was set up, it brought agriculture fully under the trade regime for the first time, as well as introducing rules on plant and animal health (sanitary and phytosanitary standards) and IP. IP rules were introduced into the WTO against the wishes of developing countries, however, and with relatively little involvement of most stakeholders in developed countries. Instead, they were promoted and initially drafted by a small group of transnational actors from four major industries – film, music, software, and pharmaceuticals and biotechnology (Drahos, 1995; Drahos and Braithwaite, 2002; Matthews, 2002; Sell, 2003). This group saw that in global markets they needed global rules on IP if their business model was to survive and they were to capture

the benefits arising from exploitation of new technological opportunities. Importantly, the inclusion of IP rules in the WTO meant that IP was introduced into agriculture for the first time for many countries, since the WTO rules require the patenting of micro-organisms and some form of plant variety protection through the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).

One problem here is that these global-level negotiations take place in different international bodies, are carried out by differing government departments – such as environment, agriculture, commerce, patent offices and trade – and are hard for many stakeholders to understand or influence. It is difficult for low-income and smaller countries to participate in them effectively, because of both the need for special expertise and the high costs. This complexity often makes it difficult to get coherent policies across the different areas (Petit et al, 2001). So, although more and more institutions/treaties/agreements/regimes are required as agricultural, environmental and trade systems become ever more global, problems arise when rules and regimes overlap (requiring legal interpretation and negotiation). Furthermore, when regime remits are similar, but their provisions benefit some more than others, then states 'shop around' for the most beneficial possible outcomes of membership in different regimes.

Before discussing IP further, we need first to look at the changing food system.

Food Policy and a Changing Food System

Enormous challenges face us in ensuring a sustainable, secure, safe, sufficient and nutritious (in other words healthy), equitable and culturally appropriate diet for all, which should be the aim of food policy and a functional food system (Tansey and Worsley, 1995). Yet few governments have consciously tried to link the different elements of national policy to food and produce coherent food policies. One reason is complexity. Food policy is about what influences the set of relationships and activities that interact to determine what, how much, by what method and for whom food is produced and distributed, and by whom it is consumed. It deals with the food economy, which is a subset of the wider economy (OECD, 1981).

Humans are very adaptable and can have a wide variety of diets, as the variety of peasant cuisines, developed from what was locally available, shows. Furthermore, these diets have changed, absorbing new plants and animals and yielding new products as humans have spread across the planet, as empires have waxed and waned, as the rich have sought new delicacies, and as the poor have sought to have what the rich had. Wherever we are today, the food we eat could have been different, and probably was in the past. What we eat has a history, and that history is not simply a history of food but a history of culture and society.

Food is a basic necessity for life. We eat foods, not nutrients, and different foods fulfil a wide variety of roles in our lives, not simply in terms of sustenance but physiological, social and cultural. We use food for reward, for pleasure, to express status, culture and religious preference, and so on. In spite of the overall adequacy of food availability in the world, however, there continue to be huge differences in the amount and quality of food that people eat, as discussed above.

Food comes from our environment – people have to grow or gather it, or fish or hunt it. Continued food supplies depend upon maintaining a healthy environment and upon having a diverse range of plants and animals available to us to make it possible to keep breeding varieties that can cope with the

diseases, changes in climate and other stresses that farmers, fishers and herders face. That is why agricultural biodiversity is crucial. And it means that ecological wellbeing is a core requirement for our future food supplies, and that new technological development needs to take it into account (ETC Group, 2004).

Actors and interests

There are many different groups of actors involved in bringing the food we eat to our mouths (Tansey and Worsley, 1995), unless we live a mainly self-provisioning life. Most of the actors found in industrialized countries – farm input suppliers, farmers, food processors and manufacturers, distributors, workers and caterers – may all be in the same household in largely smallholder farming communities. Even then, there is probably a need to have other input suppliers for fuel or fertilizer, traders to sell surplus to, and retailers or wholesalers to buy from. For most town and city dwellers and people in the wealthier countries, or wealthier people in poorer countries, what they can get to eat depends largely on others. The various actors in the food system are engaged in a struggle over who will have *power* and *control* over the production and supplies of food, and how the *benefits* and *risks* arising from different activities will be distributed. Increasingly, the money made out of food does not go to farmers but to those who supply them and who are intermediaries between them and our mouths.

Fortunately, we do not need that much food to live healthily. A healthy diet can be obtained from a relatively simple mix of a staple source of carbohydrate supplemented with some sources of protein and fruits and vegetables – which the great cuisines of the world tend to be based on – although some communities, for example the Inuit, have even more specialized diets linked to special environments. Our limited need for food, however, poses a problem for businesses working in food in a market economy. To prosper they need to expand their business, especially if they are publicly quoted companies. This limited demand puts greater pressures on food-related businesses than many others. Think, for example, of a pair of shoes, a radio, a CD, a TV or a car. You can increase your consumption of these many times – you can have 10 pairs of shoes, 50 CDs, three radios, two TVs and two cars – without any physical harm coming to you. But you cannot increase your basic food intake two-, three- or fourfold without serious harm – as indeed we are seeing in the obesity epidemic spreading around the world.

The pressure on businesses increases the competition between them, the desire to find new technologies to give them an edge over others, to look for ways to increase the productivity of the money, land or people used in the business, and to diversify from what they started doing into other activities, products – especially high value products – or markets.

Trends and tools

Three key trends have affected how the food system – indeed the economic system more generally – develops. First, a growing economic concentration of power in any of the sectors – from farm input suppliers such as agrochemical, energy or equipment companies to traders, retailers and caterers – means that fewer and fewer firms control more and more of the market. Box 1.3 illustrates this for the agriculture input industry, an area where changing IP rules is important in fuelling the trend. The increasingly concentrated market power enables the ability of these bigger players to affect prices, reduce competition and set standards within a sector (Murphy, 2006; Vorley, 2003). A recent development has been that:

Box 1.3 Tracking the trend towards market concentration: The case of the agricultural input industry*

There is clear evidence suggesting a trend towards greater concentration at several stages in various commodity sectors. Focusing on the agricultural input segment, there has been a process of consolidation in the global agribusiness in recent years (by means of divestitures, mergers and acquisitions), the outcome of which is a few major integrated companies, each controlling proprietary lines of agricultural chemicals, seeds and biotech traits. A significant increase in the concentration of the agrochemical industry has been observed, with three leading companies accounting for roughly half of the total market. An upsurge in seed industry takeovers and changes in rankings (with the acquisition of Seminis in 2005, Monsanto surpassed DuPont in the global seed market) occurred between 2004 and 2005. Some of the largest agrochemical companies have branched out forcefully into plant biotechnology and the seed business, heralding a move towards unprecedented convergence between the key segments of the agriculture market (agrochemicals, seeds and agricultural biotechnology).

Besides mergers and acquisitions, another aspect of structural change of interest in this area is increased 'coordination', which typically refers to contractual arrangements, alliances and tacit collusive practices. At the horizontal level, evidence suggests a trend towards heightened strategic cooperation among the largest competitors in the agricultural biotechnology sector. It is also interesting to note vertical coordination upward and downward along the food chain, with the establishment of food chain clusters that combine agricultural inputs (agrochemicals, seeds and traits) with extensive handling, processing and marketing facilities.

On the one hand, the need to consolidate patent portfolios and thus ensure freedom to operate appears to have created incentives for the extensive mergers and acquisitions that have occurred between agricultural biotechnology and seed businesses, and for other cooperative responses short of full integration (such as cross-licensing). On the other hand, because of the breadth of protection accorded to the patent holder (the seed or biotech company), concentration in agricultural biotechnology is giving the largest corporations unprecedented power vis-à-vis growers and other stakeholders. In particular, the privatization and patenting of agricultural innovation (gene traits, transformation technologies and seed germplasm) have supplanted the traditional agricultural understandings on seed and farmers' rights, such as the right to save and replant seeds harvested from the former crop. In some jurisdictions, the privatization and patenting of agricultural innovation has resulted in a drastic erosion of these traditional farmers' rights, and the assertion of proprietary lines on seed technologies and genetic contents has changed farmers from 'seed owners' to mere 'licensees' of a patented product.

Note: * This is the Executive Summary from a study with this title prepared by the UNCTAD Secretariat, United Nations Conference on Trade and Development, 20 April 2006, available at www.unctad.org/en/docs/ditccom200516_en.pdf (last accessed 29 July 2007).

> *the plant genetics industry is now heavily concentrated in a half-dozen major firms that hold substantial numbers of key patents on germplasm. They also have IP coverage of the related enabling technologies. … [T]he control of patents and seed distribution networks exercised by these companies has substantially increased the barriers to entry for new firms in the field of germplasm development.* (Falcon and Fowler, 2002, pp204–205).

Second, there is a shift from local to national, regional and global markets, with some larger players increasingly seeing the world as a global

market and organizing to be active in it. And the third trend is to look for ever better, more certain, more effective tools to help control the risks faced by the different actors and to secure the desired benefits. The various tools for control used are science and technology, information, management, and laws, rules and regulations.

Science and technology

While science and technology are often talked of together, they are not the same. It is not necessary to have a correct scientific understanding of something to develop a technology that works. Trial and error, treating things as black boxes, where doing X produces Y, without understanding exactly why, is sufficient to develop many forms of technology. Sometimes, however, a revolution in scientific understanding is needed to conceive of new technologies. Such was the shift Einstein brought to physics when he showed matter and energy were interchangeable, which opened up the possibilities of nuclear power. Another such revolution has occurred in biology, with the understanding that living organisms grow and develop through the expression of genes, encoded in DNA, which are built from the same four building blocks. This understanding makes it possible to conceive of ways to re-engineer living organisms and gives rise to genetic engineering and other aspects of modern biotechnology, such as cloning, genomics and marker-assisted breeding. It is now possible, in principle, to mix genes from any species with another and possibly synthesize new life forms (synthetic biology) although the desirability of doing so and the long-term effects are hotly debated. These possibilities are leading to different actors seeking to redesign many living organisms of commercial value in agriculture. The questions arising concern whether they *should* do so; who carries the risk and gets the benefits if they do; and the possible longer-term effects and implications.

Information, management and law

Information is another tool different actors use to affect food habits. Some types of information may be designed to inform or educate, while other forms are used to market or advertise, or in promoting public relations or lobbying for specific policies. The spread of global media, broadcasting similar images across the world, helps fuel product globalization and reinforce brand images, usually protected by trademarks or copyright.

Understanding and influencing consumer behaviour has become a major interest of retail businesses. Today, cognitive science is increasing understanding of human motivations and behaviours, and insights from this may help bigger players to use ever more subtle ways to influence people's attitudes and buying habits. Information technology and data processing methods – which affect the capacity both to carry out basic scientific procedures, such as gene sequencing, and to manage businesses and supply chain logistics and profile customers – are also widely used by many of the bigger actors.

Other management tools, such as logistics, may be used to determine the supply systems most advantageous for the businesses involved. For example, the UK's biggest food retailer and an increasingly global player, Tesco, invested heavily in supply chain logistics in the 1980s. In industrialized countries, work organization has shifted from craft-based, small-scale production to a large-scale, mass-production phase, which now often uses just-in-time manufacturing and stocking techniques. In the US, business methods themselves are patentable.

Information and management activities tend to be the preserve of firms and governments and to focus on children, other businesses or consumers – the people who

influence or make decisions about what to buy in market economies. Yet unlike the major actors in the system – the input suppliers and processing, retailing and catering companies that are best able to use information and management tools – consumers are unorganized individuals. Consumers can have a significant effect on policy, however, when they take action en masse, such as stopping buying beef because of fears over mad cow disease (BSE), or work through consumer groups. Otherwise firms can simply open a new niche in the market to cater for a specific group of consumers' tastes or concerns.

Marketing, public relations and advertising go together to influence people's behaviour. Much effort and expense goes on these tools, which are more easily used by the larger players in promoting their particular product, approach or image.

When consumers act as citizens, however, they may be able to shape the environment in which all the other actors operate through influencing the choice of government and the laws, rules and regulations governments put in place to balance the range of interests in society. When laws are developed and applied nationally there is a greater chance that a range of people affected by changes can have a say in shaping such changes. This becomes more difficult as rule-making processes become more global, with rules being set by international intergovernmental organizations. For just and balanced outcomes, both nationally and internationally, it is important that rule-making processes do not become captured by vested interests.

One set of rules that has moved from being set nationally in national economic interests to being promoted globally as minimum standards that all countries must adhere to are those on IP, and it is to this that we now turn in more detail.

A Legal Fiction – Intellectual Property

Origins of IP

So where does IP come from? As P. Drahos points out, '"Intellectual property" is a twentieth-century generic term used to refer to a group of legal regimes [such as patents, trademarks and copyright] which began their existence independently of each other and at different times in different places' (Drahos, 1996, p14). These different forms provide creators and inventors with legal protection from someone copying or using their work or invention without permission. Some protect the intellectual knowledge behind technological innovations (patents) and others protect creative works such as books, films and music (copyright). They also include trademarks such as those connected with branded goods, geographical indications like Stilton cheese and champagne, and trade secrets such as the formula for Coca-Cola or the parent lines of hybrid plants. These different forms of IP are an invented kind of intangible property – yet just as valuable as oil, gold or land for some. Societies construct the rules governing them through political processes dependent on power plays for their outcomes (May, 2000). They are not like a natural phenomenon such as gravity waiting to be discovered. In today's knowledge-based market economy, control of so-called 'intellectual property rights' (IPRs) helps in controlling markets and influences the distribution of wealth and power (Box 1.4).

The ordinary concept of property itself is not a natural phenomenon but a socially constructed one. For some indigenous peoples or religious groups, for example, the idea of ownership of land or water, a fundamental in most current ideas of tangible property, is literally 'non sense' and does not figure in their way

Box 1.4 What are IP rights?

IP rights are legal and institutional devices to protect creations of the mind such as inventions, works of art and literature, and designs. They also include marks on products to indicate their difference from similar ones sold by competitors. Over the years, the rather elastic (and arguably misleading) intellectual property concept* has been stretched to include not only patents, copyrights, trademarks and industrial designs, but also trade secrets, plant breeders' rights, geographical indications and rights to layout designs of integrated circuits. Of these, patents, copyrights and trade marks are arguably the most significant in terms of their economic importance, their historical role in the industrialization of Europe and North America, and their current standing as major pillars of the international law on intellectual property.

Patents provide inventors with legal rights to prevent others from using, selling or importing their inventions for a fixed period, nowadays normally 20 years. Applicants for a patent must satisfy a national patent issuing authority that the invention described in the application is new and susceptible of industrial application (or merely 'useful'** in the US) and that its creation involved an inventive step or would be unobvious to a skilled practitioner. Patent monopolies are extremely valuable for business.

Copyrights give authors legal protection for various kinds of literary and artistic work. Copyright law protects authors by granting them exclusive rights to sell copies of their work in whatever tangible form (printed publication, sound recording, film and so on) is being used to convey their creative expressions to the public. Legal protection covers the expression of the ideas contained, not the ideas themselves. The right lasts for a very long time indeed, usually the life of the author plus 50–70 years.

Trademarks are marketing tools used to support a company's claim that its products or services are authentic or distinctive compared with similar products or services of competitors. They usually consist of a distinctive design, word or series of words placed on a product label. Normally, trademarks can be renewed indefinitely, though in most jurisdictions this is subject to continued use. The trademark owner has the exclusive right to prevent third parties from using identical or similar marks in the sale of identical or similar goods or services where doing so is likely to cause confusion. One of the main benefits of trademarks to the wider public is that they help to avoid such confusion.

Notes: * It is important to note that IP does not lend itself to any precise definition that would satisfy everybody. Indeed, a recent document published by the World Intellectual Property Organization expressed some quite reasonable scepticism about its validity:

> *Intellectual property, broadly conceived, may be seen as a misnomer, because it does not necessarily cover 'intellectual works' as such – it covers intangible assets of diverse origins, which need not entail abstract intellectual work; nor need it be defined and protected by property rights alone (the moral rights of authors and the reputation of merchants are not the subject of property, under a civil law concept).* (WIPO, 2002a, p9)

** Although usefulness appears to be a less demanding requirement, it is possible for a claimed invention to pass the test of industrial applicability in Europe but to fail the usefulness text in the US. As Alain Gallochat, adviser to the French Ministry of Technology, explains: 'one can imagine a product or a process giving an answer to a technical problem, or involving steps of a technical nature, but without any utility: such an invention, patentable according to the European system, shall not be patentable according to the America system'(Gallochat, 2002, p5).

Source: Taken from Dutfield, 2003a, pp1–2

of seeing the world. The idea of creating an intangible form of property, which developed in the past few centuries in Europe, is 'entirely a legal construction' (May, 2002). In other words, human beings, at least those with power in society, make it up and then seek to justify it

Box 1.5 Justifying IP – No simple matter

Justifying IP is a formidable task. The inadequacies of the traditional justifications for property become more severe when applied to IP. Both the non-exclusive nature of intellectual objects and the presumption against allowing restrictions on the free flow of ideas create special burdens in justifying such property. … [F]ocusing on the problems of justifying IP is important not because these institutions lack any sort of justification, but because they are not so obviously or easily justified as many people think. We must begin to think more openly and imaginatively about the alternative choices to us for stimulating and rewarding intellectual labour. (Hettinger, 1989, pp51–52)

Patents not only underwrite a scheme of property rights, but they order the process of invention in two ways that could be seen as intrinsically political. One is to designate classes of things that can be considered property. The extension of patents to new domains alters basic notions of what a commodity is and who can assert ownership over it. When a patent is awarded for a biological product, it has the effect of removing the thing being patented from the category of nature to the category of artifice – a profound metaphysical shift that, at least in theory, should invite public deliberation. The second political function is distributive. Patents assign ownership rights within production systems, rewarding some participants in the discovery process more than others. For instance, lab technicians' and research subjects' names are rarely written into patent applications; nor do these individuals normally share in the economic proceeds from specific inventions. The institutions in which inventive work is carried out do, by contrast, earn the lion's share of royalties. In this way, patents act as instruments of economic distribution. (Jasanoff, 2005, p204)

(Box 1.5). To be socially acceptable in European society, for example, the notion of IP also required a society secularized enough to accept that creative genius was a personal trait, not a divine gift, that intellectual products had to have a commercial value in their own right and that private rights had to be distinguishable from those of sovereigns (Lesser, 1997).

Historically, IP rules have been a matter of national decision making based on national economic interests. Countries with a national interest in having strong patent rules, because they produced a lot of technology, for example, did create such rules, those without such a capacity did not. Countries copied technologies from each other, selectively offered patent rights, for example to domestic inventors over foreign nationals, or simply did not allow any patents on some products such as medicines (Chapter 3). International treaties in patents and copyright originated in Europe and the US and countries signed up to them if it suited them. Some did not fully adopt the existing international rules. For example, until the mid-1980s, the US protected the domestic printing industry by denying copyright to foreign authors unless their books were printed in the US.

Even today, patents still must be applied for in each country, although there are mechanisms to enable companies to apply for them in many countries at the same time through the World Intellectual Property Organization (WIPO – see Chapter 4). WIPO is an international institution where many international discussions and negotiations about IP take place, but it is no longer the only one, following the introduction of the Trade-Related Aspects of Intellectual Property Rights Agreement (TRIPS) as part of the WTO package of Agreements (Chapter 2). In WIPO countries are free to sign up to each of the various agree-

ments individually. It was this that posed a problem for those industries and countries that wanted to safeguard their economic interests with a global IP regime and led them to seek to introduce minimum standards for IP rules through the WTO.

Concerns about IP

The strengthening and extension of the IP regime has led to a range of concerns over the impact of the new IP regime on low- and middle-income countries, especially the effects on health, in particular concerning access to medicines, such as AIDS drugs in Africa or basic diagnostic techniques for screening for breast cancer. Similar concerns about the effects of IP on access to seeds and knowledge needed for research and development are being raised by a range of academics, policymakers and NGOs such as GRAIN and the ETC Group. These include IP's effects on who does what research and development, how and whether smallholder farmers can continue farming, especially in low- and middle-income countries, and the increasing concentration of power in the various sectors of the food system (Chapter 8). Other concerns are over the way in which these rules were agreed and extended globally and the continued pressures for developing countries to adopt ever higher standards of IP protection (Chapter 7). A central issue is whether the new IP regime has the balance of interests right between those who receive the privileges IP affords and those negatively affected by it. Another issue is the need for the IP rules to be embedded in a broader regulatory regime that can curb the tendency to monopoly and abuse (such as cartels) that IP can give rise to:

> *The immediate impact of intellectual property protection is to benefit financially those who have knowledge and power, and to increase the cost of access to those without.* (IPRs Commission, 2002, p47)

The UK government recognized the complexities and concerns about IP in its White Paper on International Development in 2000 and set up a Commission on Intellectual Property Rights (IPRs Commission) to consider 'how intellectual property rules might need to develop in the future to take greater account of the interests of developing countries and poor people'. The Commission reported to the Secretary of State for International Development at the Department for International Development (DFID) in September 2002 and noted that:

> *Developing countries … negotiate from a position of relative weakness. … The immediate impact of intellectual property protection is to benefit financially those who have knowledge and power, and to increase the cost of access to those without.* (IPRs Commission, 2002, p47)

It also noted that:

> *Developing countries should generally not provide patent protection for plants and animals … because of the restrictions patents may place on use of seed by farmers and researchers. … [T]he extension of intellectual property protection does carry the risk of restricting farmers' rights to reuse, exchange and sell seed, the very practices which form the basis of their traditional role in conservation and development.* (IPRs Commission, 2002, pp66–68)

The Bigger Debate on IP

To have …

The proponents of a strong global IP regime argue it provides the necessary incentive, proper reward and required security for investment in R&D to produce life-improving innovations. Historically, two main moral and philosophical arguments for rewarding creative and innovative people have been used. One stems from the view of the 19th-century German philosopher Hegel – that an idea belongs to its creator because the idea is a manifestation of the creator's personality or self. The other is drawn from the work on real property by John Locke, the 17th-century English philosopher – that the usefulness of physical or natural objects came about through human effort and that those who had expended that effort had a moral claim to exclusive use of those objects (May, 2000).

Today, in practice in industrialized countries, the rationale for protecting the intangibles created by IP is essentially utilitarian – with the utility focused on promotion of innovation on the assumption this bring benefits for all. For example, knowledge about how to make something, unlike a physical object such as a piece of bread, can be used or consumed by one person without limiting its use by others. Sharing knowledge with others, then, does not reduce the amount you have, unlike sharing a piece of bread. However, it might reduce the advantage you may have had if you were the only one to know something or were allowed to exclude others from using what you know. The problem is that while the widest possible dissemination of new knowledge makes for the greatest economic efficiency, if everybody is free to use new knowledge, inventors have little incentive to invest in producing it. The various forms of IP stop that sharing (usually temporarily) by transforming knowledge from a shared public good into a private good. In other words IP creates scarcity where there need be none. This gives the holders of IP enhanced market power and permits the use of monopoly pricing through which they can recoup their expenditure in research and development. Creative minds and innovative firms thus have an incentive to engage in inventive activities. The IP regime, then, plays an important role in underpinning private sector-led innovation, and also in the ability of firms to establish and maintain market power.

This argument provides the main rationale for the protection given by patents, copyright, plant breeders' rights and other types of IP. However, the various forms of IP in different countries differ in terms of the subject matter that may be eligible for protection, the scope (what can be protected) and duration (length of time) of protection, and possible exemptions to exclusive rights. This reflects the fact that they are a concession granted by a society, through the laws it constructs, which advantage a specific group for broad social goals (increasing creativity and inventiveness) and try to balance the interests of producers and users of intellectual works.

The EU clearly sees IP playing a role in helping to secure its members' economic interests in the development and application of modern biotechnology. Among the measures proposed by the European Commission in a 30-point action plan is creating a 'strong, harmonized and affordable European intellectual property protection system, functioning as an incentive to R&D and innovation' (CEC, 2002, p25) as one support for utilizing the full potential of biotechnology and strengthening the European biotechnology sector's competitiveness.

… or not to have?

In an extensive study reviewing the main justifications for IP – whether for reward to authors or to promote innovation – political scientist Chris May argues that their real purpose today is protecting financial investment. In some countries this is identified with the national interest. May notes that, when negotiating to put new IP rules into the WTO in TRIPS, the US saw them as a way 'to retain its competitive advantage in the global system' (May, 2000, p119). This is not seeing them as a way of transferring up-to-date technology but rather of maintaining the gap between those countries with technology and those without to ensure national advantage. However, May argues that the gap is legitimized by using IP justified on the basis 'not of advantage, but of the rights of the individual knowledge innovators'. This view of the expanding IP regime as one of the ways of preventing development is put more graphically by University of Cambridge economist Ha Joon Chang, who talks of 'kicking away the ladder' (Chang, 2002).

James Boyle, a professor of law at Duke Law School, argues that the effects of a global IP regime will be widespread and not as beneficial as its proponents suggest. He helped draft a declaration which suggested that:

> *The blandishments of the international information industries notwithstanding, more intellectual property rights may actually mean less innovation, less heterogeneity in culture and environment and a less informed world of public debate.* (Boyle, 1996, p197)

This is basically because they may underpin a highly concentrated market structure dominated by large firms that use these rules to inhibit others from threatening their position. IPRs, he argues, are being used as part of a new round of enclosures in what were formerly the 'global commons' – including genetic information encoded in the genes of people, plants, animals and micro-organisms (Boyle, 2001). This is part of what Peter Drahos sees as a trend towards 'proprietarianism – a creed which says that the possessor should take all, that ownership privileges should trump community interests and the world and its contents are open to ownership' (Drahos, 1996, p202).

Drahos warns against thinking of IPRs as rights. Instead we should think of them as *privileges*:

> *Unlike real property law, intellectual property law posits rights in abstract objects … IPRs are rule-governed privileges that regulate the ownership and exploitation of abstract objects in many fields of human activity … [they] are liberty-intruding privileges of a special kind … they promote factionalism and dangerous levels of private power. From the point of view of distributive justice, their scope should be limited … there are strong reasons for supporting private property rights, but we should do so in a contingent, consequentially-minded way … guided by a philosophically defensible view of the role of property in social life and democratic culture.* (Drahos, 1996, pp1, 5)

Drahos sees stronger, global IPRs resulting in a new form of 'feudalism'. This is because they will alter social relations in ways that mean individuals never 'own' entities like software or seeds. Instead purchasers are only licensed by their corporate rights holders to use them in very limited ways and are excluded from socially important acts normally associated with real property – the ability to lend, share, give away or sell (Drahos and Braithwaite, 2002). Thus the issues surrounding IP go far beyond the focus here on food and agriculture.

Not rights but privileges

It would be a more accurate reflection of reality if we stopped using the term 'intellectual property rights' and instead talked of 'business monopoly (or exclusionary) privileges'. Using more accurate language would also avoid any confusion with human rights discussions (see Chapter 7). The language of privilege, even if these privileges are enshrined in law rather than custom, helps make clearer the political and power-based mechanisms that lead to some being privileged over others. They also make clearer their instrumental purpose, which is geared to market-based creative and inventive business operation across a wide range of fields, among which agriculture has become a recent target.

It may also make it easier to unpick the rather mystifying terminology of IPRs. This terminology has conflated what used to be called 'industrial property', such as trademarks, patents and industrial designs, with copyright. This latter is connected, especially in Europe, with notions of the moral rights of authors to be identified with their work and not have that work distorted.

Patent problems

Of particular concern to many is the extension to developing countries, through the WTO TRIPS Agreement (Chapter 3), of minimum requirements on patenting. This issue is made more complicated because a system that was developed for innovation in inanimate objects has, in some countries, been extended to cover living organisms and parts of them. Patents are supposed to provide benefits to their owners and society at large. Patents are granted in the US on the basis that there has been an invention of something new, useful and non-obvious; in Europe on the basis of being novel, having industrial application and involving an inventive step. A major concern today even in the US and EU is that the meaning of these words has been devalued and poor quality patents are being granted for 'inventions' that lack novelty and an inventive step.

Moreover, in reality, 'the basic patent bargain works only in theory. In practice, both sides cheat', argues Professor of Information and Organization at Sheffield University, Stuart Macdonald:

> *Most obviously, the patent affords protection only when the patentee can afford to enforce his rights, which may mean that the poor have no protection at all. … And if society cheats in not providing the protection the inventor has a right to expect from the patent system, the inventor cheats too. Only in theory does the inventor provide society with the information of invention: in practice, he discloses the information required by the patent system, not the information required by society to replicate and develop his invention.* (Macdonald, 2001)

This raises questions both about the justice of the system, if it is not equitable in its functioning, and about whether its application fails to meet the objectives for which it is designed. Currently, patents are also very unevenly distributed globally, as 'industrialized countries hold 97 per cent of all patents worldwide' (UNDP, 1999, p68).

US economist Keith Maskus writes:

> *There are legitimate reasons to be concerned about the highly protective standards that have emerged recently in the US and the EU. These laws and judicial interpretations provide broad patent protection for software and biotechnological inventions. They also promote extensive rights in the formulation of databases, which could have a negative effect on scientific research. It remains to be seen whether such standards tilt the balance within those jurisdictions toward the private rights of*

> *inventors and away from the needs of competitors and users. It is not too early to claim that they are inappropriate for developing economies and net technology importers.* (Maskus, 2000, pp237–238)

Clear evidence that the patent system has stimulated the development of new products and technologies, which otherwise would not have been developed, is only available for a few sectors, such as pharmaceuticals – and even here basically 'for those diseases where there is a large market in the developed world' (IPRs Commission, 2002, p33). The rationale for patents in the pharmaceutical industry, for example, is that the exclusive rights they confer allow the industry to charge high prices for products and so recoup its research and development (R&D) costs. Once drugs go off-patent and generic suppliers enter the market, prices fall, often dramatically, making medicines more accessible to the poor. In pharmaceuticals, however, where most R&D is commercially led, the industry has not produced drugs aimed at diseases of the poor, nor at those with relatively few sufferers, without some form of government incentive. Much basic research is also done by government and then turned over to companies for commercialization. In effect, consumers pay for it twice, first through taxes that fund government research and then via high prices for drugs under patents that fund corporate activities. These problems have led to much debate in the health sector about the patent regimes' effect on access to medicines, especially in developing countries (MSF, 2004; Roffe et al, 2006).

In other sectors, patents are sometimes considered to have anti-competitive effects: they serve to secure and strengthen the position of market leaders and limit the entry of new competitors. Indeed, they were used in this way in the 19th century (Jenkins, 1975). In the extreme, they may actually slow the pace of innovation if a dominant firm possesses a powerful pool of patents that limits the ability of other firms to further improve existing products and technologies and acts in an anti-competitive way.

Although policymakers have sought to limit the adverse effects of patents through revised IP legislation, competition policy and other business regulations, the anti-competitive implications of patents remain a cause of concern, for example patent pooling and cross-licensing between a few firms in effect creates a cartel keeping others out. Such concerns have regained momentum with the emergence of patents on biotechnology products and processes that cover fundamental research tools, human genes, genetically engineered plants and other living organisms.

IP in Food and Farming

IP pervades today's industrialized food system. The Gowers review of IP in the UK gave the example of a jar of a well-known brand of coffee:

> *The contents of a jar, the lid and seal may be protected by patents. Registered and unregistered design rights can also protect the lid and shape of the jar. Copyright can protect the artwork in labels, and trademarks can protect the shape of the jar, labels, colours used and brand names.* (Gowers, 2006, p1)

From consumers …

Broadly speaking, the various kinds of IP are used more by some firms than others, often based on whether they are selling to a final consumer or producing for intra-firm trade or

farmers. Trademarks, geographical indications and trade secrets are widely used by firms and actors dealing with the final consumer. The use of trademarks is often linked to other tools for control, such as brand advertising. Greater efforts to protect brands and increase market share are increasingly likely. In 1993, the chairman of Unilever, the Anglo-Dutch multinational, called brand equities 'the most valuable items in our stewardship' and saw 'the power of our brands as the engine of long-term growth' (Tansey and Worsley, 1995, p115). During that year, the company spent almost 12 per cent of turnover (£3284 million) on advertising and promotional investment. In 2000, Unilever announced plans to dispose of three-quarters of its 1600 brands to focus on just 400 around the world. In 2002, its chairmen said, 'We are focused increasingly on driving the growth of our leading brands and dealing with other brands in ways which create value for shareholders' (Burgmans and Fitzgerald, 2002). Other global companies with many fewer or single brands also spend heavily on advertising and marketing. In 2006, for example, over US$2.5 billion was spent advertising Coca-Cola while McDonald's selling, general and administrative expenses amounted to over $2.3 billion. These figures are much more than the annual budget of the WHO and around three years of the FAO's budget.[1] Yet, as research by the Food Commission in the UK illustrates, there is an inverse relationship between what is advertised and what is recommended as a healthy diet (Dalmeny et al, 2003).

As the reach of the market and mass marketing techniques, especially in an increasingly globalized market, go further into low- and middle-income countries, so too will the major actors make use of various forms of IP as part of their business development strategy. In urban societies served by multiple retailers – supermarkets are also spreading rapidly in many rapidly urbanizing developing countries today – advertising and media images become more important and unless farmers or producers have a major brand they will not get their goods on the retailers' shelves. Normally, only the top two or three brands of a given product actually do.

For some products, a combination of widely advertised branded products (which are based on trademarks) and trade secrets – the recipe for Coca-Cola being the most famous – are used. For others, producing a product in a particular way or region, a designated name, linked to the region and method of production, provides a marketing tool that allows them to capitalize on their uniqueness. These geographical indications (another form of IP) are of considerable importance in some foods, for example Roquefort cheese or Parma ham. Such designation normally comes out of a well-established activity that has national recognition and produces products sought after by consumers. The ability of small producers to find markets for their often unadvertised products or to develop new geographical indications which they have little capacity to promote is very different from those whose supply chains lead into nationally, regionally and globally promoted branded products.

… to producers

If gardeners buy a rose or other ornamental plant from a garden centre, they may find a note attached saying they are not allowed to take cuttings or otherwise propagate the plants they buy. The same may be the case for some farmers and vegetable growers, with restrictions placed on their saving seed. This is possible because the holders of another form of IP, in this case plant breeders' rights or, in a few places, patents, can legally exclude people from doing things they might otherwise have done, like replanting seed saved from a previous crop that they have grown.

For farmers in the wealthier parts of the world who buy seed, fertilizer, feeds, agrochemicals and equipment, and for researchers

developing new breeds, varieties and products for them to use, the key forms of IP are plant breeders' rights (Chapter 2) and patents (Chapter 3). These forms of IP will increasingly influence control of food production in a world where genetic engineering and commercial breeding becomes more prevalent. Where farmers in developing countries are the focus of seed sales, however, it seems that commercial horticultural seed producers consider trademarks to be as important as plant variety protection, at least according to the author of a recent study (Louwaars, personal communication, 2006), which examined the impact of plant variety protection on the breeding and seed sector in developing countries (Louwaars et al, 2005). Trade secrets are potentially also important as they are used to protect hybrids, with the parent lines kept secret, but these are difficult to enforce in most countries. While these forms of IP have been used in the urbanized, industrialized countries for a few decades, they are still very new in many low- and middle-income countries.

Patent power

Patents are very important for the development of agrochemicals and many controversial developments in modern biotechnology (Barton, 2003; Box 1.3), especially genetic engineering and now nanotechnology. Agrochemicals have long been patentable, but it was only recently – in 1980 – that a genetically-engineered microorganism was first allowed to be patented in the US, following the *Diamond v. Chakrabarty* Supreme Court case in 1980 (Dutfield, 2003a, 154ff). Within a few years plants and animals, and parts thereof, such as genes, were also allowed to be patented in the US (although a special form of plant patent on asexually reproducing plants had been available in the US since the 1930s). Once patent law was extended to cover living organisms in the US, companies were then able to move into and work in this area as they would now be able to capture the benefits by excluding others from using such organisms through the patent system. It also led to pressures in other industrialized countries to allow similar extensions in their patent law, although many restricted patentability to genetically engineered organisms, not allowing naturally occurring ones to be patented.

The potential of genetic engineering to open up new market opportunities all over the world fuelled an expansion of private sector interest in agricultural research in industrialized countries. This happened at the same time as public sector-financed R&D in agriculture declined and moved away from research of practical benefit to farmers. Instead, public sector-financed R&D increasingly focuses on more basic research that produces results that can only be used by the larger corporate players that have R&D facilities (Millstone and Lang, 2003, p40; see also Chapter 8).

The firms involved in the private sector-led transformation of the basic inputs into agriculture want a set of rules and regulations to permit them to secure benefits from their R&D and avoid costs. If they can, companies naturally want to stop others from copying – or buyers reproducing – their new products. This can be done in two ways. One is by legal means, through patent and other IP rules. This has led to a clash between real property rights of farmers about how they use their land and the rights of patent holders (Box 1.6). The other means is technological. Breeding hybrids, for example, which do not reproduce truly and lose their yield characteristics in subsequent generations is one such method (Lewontin, 1993). This creates a kind of 'economically sterile' seed and also promotes a planned obsolescence approach to variety production (Rangnekar, 2002a). Breeders also use trade secrets protection to keep the parents of the hybrids secret, thus making it difficult for competing breeders to get a similar cross onto the market. Another approach is to attempt to develop technologies that will stop seeds germinating or specific

Box 1.6 Regulating agricultural biotechnology: Prioritizing real or intellectual property?

Christopher Rodgers[a]

The rise of agricultural biotechnology, and the patenting of genetically modified organisms (GMOs) for use in crop production – initially in the US and Canada, but now much more widely – raises a number of very difficult legal issues. There is an inherent conflict between the traditional role of the law in protecting private property (categorized by lawyers as 'real property'), and the use of intellectual property law to protect innovations in GM technology. This is not simply a matter of legal principle – the issues at stake have dramatic implications for the future of farmers in the developing countries and for food security.

In the common law world, the primary mechanism for protecting a property owner's rights is the law of nuisance and trespass. Can non-GM farmers use the law of nuisance to claim damages for alleged 'contamination' of their crops by cross-pollination from GM crops and further remedies (for example injunctions) to prevent further cross-pollination? This contentious issue has been rehearsed in the courts in Canada (in *Hoffman, LB Hoffman Farms Inc. and Beaudoin v. Monsanto Canada and Aventis Crop Science Canada Holding Inc* (2005)[b]) and in the US (in the *Star Link Corn Products Liability Litigation* (2002)[c]), without a conclusive resolution. The only English case in which the issues have been discussed was *R v. Secretary of State for the Environment ex parte Watson* (1999)[d]. In this case the grant of a licence for field trials of GM maize was challenged on judicial review by a neighbouring organic sweet corn producer. The challenge was unsuccessful due to the court's unwillingness to interfere with the risk assessment undertaken by the UK government's specialist scientific advisers, the Advisory Committee on Releases to the Environment (ACRE). The environmental risk assessment carried out by ACRE indicated that the danger of cross-contamination was so small as to be statistically insignificant. In the course of a short judgement dismissing the claim, Lord Justice Buxton commented that the applicant's case 'sounded like one of private nuisance' and should have been pleaded as such, as the claim was ultimately aimed at restricting the research institute's right to use its property for an otherwise legitimate purpose. The court characterized organic farming as a 'hypersensitive' land use that would not be protected by the common law of nuisance.

Although the issues were not explored in depth, this case illustrates the considerable difficulties for any organic farmer seeking to establish legal liability for alleged GM 'contamination' of his land or crops in nuisance. There are difficult problems of causation, and in establishing that the cross fertilization of a non-GM crop constitutes either property 'damage' in the required sense, or is causing an unreasonable interference with the farmer's use of his land.

On the other hand, the courts have adopted a radically different stance to the protection of *intellectual* property. One of the *causes célèbres* in the recent history of biotechnology law is the decision of the Canadian courts in *Monsanto v. Schmeiser* (2004).[e] Monsanto successfully sued a Saskatchewan canola farmer, Percy Schmeiser, for damages and an injunction, in circumstances where Schmeiser's crop had acquired (without his consent) Monsanto's patented RT73 gene. This gives crops resistance to Monsanto's 'Roundup' glyphosate broad-spectrum herbicide. The legal basis for Monsanto's successful claim for patent infringement was the courts' recognition that they could maintain patent protection in the patented gene even when it had passed by cross-fertilization into Schmeiser's canola crop. The Supreme Court of Canada saw nothing to prevent the recognition of two sets of property rights subsisting simultaneously in Schmeiser's crop; that of the farmer in the land and the crops it produced, and that of Monsanto in the

gene giving resistance to its Roundup herbicide.[f] Unlike nuisance (which requires the proof of 'unreasonable' interference with real property rights), the law protecting patent rights is based on strict liability: Schmeiser was in breach of patent law simply because he had harvested a crop in which he knew or should have known that the patented gene was present, and had (as is common agricultural practice the world over) kept back a proportion of the seeds, and had then planted them the following year.

In protecting Monsanto's patent rights, the Canadian courts accorded priority to the *intellectual property* rights of the corporation over the *real property* rights of the farmer. This is not only arguably in contravention of the 'polluter pays' principle of environmental law – if this approach were to be adopted in other jurisdictions it would compromise the legal rights of non-GM farmers, who would find it much more difficult to maintain organic and/or traditional farming methods in the face of the spread of GM technology across traditional sectors of agriculture – it also illustrates a wider issue, namely the way in which intellectual property rights can be used by their owners to acquire control over the food production system, and to override the land use rights of farmers and their ability to save seed. The decision clearly gives support to the biotechnology companies to try to protect their patent rights, but jurisdictions outside Canada and the US may choose to fix a different balance between real property and intellectual property rights.

Notes:

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[b] 2002 SKQB No 67, 2005 SKQB 225 (Saskatchewan Court of Appeal);

[c] 2002 212 F. Supp. 2d 828 (US District Court, Northern District of Illinois);

[d] 1999 Env. L. R.310 (Court of Appeal, England);

[e] 2004 SCC 34 (Federal Supreme Court);

[f] See 2004 SCC 34 at paragraph 96, per McLachlin, C. J. and Fish, J. This point was also made forcibly in the Federal Court of Appeal ruling in Schmeiser: '…there is no authority for the proposition that ownership of a plant must necessarily supersede the rights of the holder of a patent for a gene found in the plant. On the contrary, the jurisprudence presents a number of examples in which the rights of ownership of property are compromised to the extent required to protect the patent holder's statutory monopoly. Generally, the existence of such a conflict of rights is not relevant to the determination of infringement [of patent] but only when fashioning the remedy if infringement is found' (Sharlow, J. A., 2002 FCA 309 judgement at paragraph 51). See also Bruce Ziff (2005) 'Travels with my plant: *Monsanto v. Schmeiser* revisited', *University of Ottawa Law and Technology Journal*, vol 2, in particular pp501–503 available online at www.uoltj.ca/articles/vol2.2/2005.2.2.uoltj.Ziff.493-509.pdf; Jennifer Chandler (guest ed) (2007) 'Law and technology: Exploring the role of the law in the conflict between organic farming and biotechnology', *Bulletin of Science, Technology and Society*, special issue, part one, vol 27, no 3, pp187–25.

traits being activated without a purchased input – so-called genetic use restriction technologies (GURTs), also dubbed 'terminator' and 'traitor' technologies (Chapter 5, Box 5.5).

As the various competing businesses developing products and processes in this area make growing use of IP, such as patents and plant breeders' rights (PBRs), to protect their investments, there has been more litigation to settle disputes (Barton, 1998). Without these forms of IP, while research would undoubtedly go on, the way and speed with which its results were developed and commercialized would almost certainly be different.

The potential of genetic engineering to manipulate plants which could be patented drew new players into the business of seed production, largely from the chemical and pharmaceutical industries. They have invested billions of dollars over the past two decades in agricultural biotechnology R&D and want to see returns on this investment, which means that the crops they have developed have to be grown commercially sooner rather than later. These companies have a long history of using patents as business tools and require some form of control over their rights to the research tools they have developed and rights to prevent

reuse of their products, such as seeds, without their permission or further payment. They were one of the important interest groups keen to allow for patenting of living organisms and are supporters of the main players pushing for stronger IP rules internationally.

There are growing concerns on the part of some researchers and NGOs that exposure to the full range of IP tools being wielded by the large firms, which are sophisticated in their use thereof, may have a major adverse impact on people's livelihoods and food security in developing countries in particular. In part this is felt to be a result of increased corporate control, undermining livelihoods and local farming systems and promoting undesirable consumption patterns (ActionAid International, 2005). When IP tools are combined with other requirements by buyers (for example identification of place of origin), the pressures for exclusion of small-scale suppliers can become even greater. Of particular concern to many is the pressure to allow patents on everything, everywhere.

Going Global

Extending IP rules globally will have wide-ranging implications for the future control of food, many of which are still to be felt. It will affect access to seeds, knowledge and anything else protected by IP. Yet access to and exchange of genetic resources is the basis of agriculture. At the same time as IP regimes are expanding, other international regimes, concerning biodiversity and agriculture biodiversity, are still being worked out in practice on the ground and in conference halls around the world. It is to these different regimes that we turn in Part II, before returning to look at the experiences and implications of these regimes for our future food security, however that is understood (Box 1.7).

Whatever people try to achieve locally in managing their food and farming, they need to know about the mix of global rules because these rules will increasingly constrain local and national action. Moreover, changes in one area tend to affect others. Part II of this book examines these new rules, the negotiations that surround them, how they interconnect and the complex web they create.

Box 1.7 Food security, insecurity, the right to food and food sovereignty

A range of terms is used in discussions about ensuring everyone in the world has enough good food to eat, produced from a sustainable food system.

According to the UN's FAO:

- **Food security** is a 'situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life'.
- **Food insecurity** is a 'situation that exists when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active, healthy life. It may be caused by the unavailability of food, insufficient purchasing power, or the inappropriate distribution or inadequate use of food at the household level. Food insecurity, poor conditions of health and sanitation, and inappropriate care and feeding practices are the major causes of poor nutritional status. Food insecurity may be chronic, seasonal or transitory.'
- The **Right to Food** is a legally-binding right and was recognized in the Universal Declaration of Human Rights in 1948 and the International Covenant on Economic, Social and Cultural Rights in 1967 (now ratified by 156 countries). In 2004, governments at the FAO adopted a set of 'Voluntary Guidelines to support the progressive realization of the right to adequate food in the context of national food security'. These guidelines aim 'to provide practical guidance to States in their implementation of the progressive realization of the right to adequate food in the context of national food security, in order to achieve the goals of the Plan of Action of the World Food Summit'.

Many farmers, pastoralists, fishermen, indigenous peoples and non-governmental organizations (NGOs) are calling for adoption of a broader concept of:

- **Food sovereignty** that is 'based on the human right to food, to self-determination, on indigenous rights to territory, and on the rights of rural peoples to produce food for local and national markets. Food sovereignty defends agriculture with farmers, fisheries with artisanal fishing families, forestry with forest communities and steppes with nomadic pastoralists.' At the Nyéléni 2007 Forum for Food Sovereignty in Mali (see www.fao.org/righttofood/; www.nyeleni2007.org), the participants identified six pillars of food sovereignty: it focuses on food for people, values food providers, localizes food systems, puts control locally, builds knowledge and skills, and works with nature (see Chapter 8, Box 8.2).

Sources: FAO (2001); Mulvany (2006); Windfuhr and Jonsén (2005).